

Integrated Pest Management

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Integrated pest management, in which the conventional pesticides are augmented by one or more nonchemical control practices, has been receiving renewed interest. What is new in this revitalization of an old technique is the careful and more knowledgeable application of a variety of control techniques.

The world's population continues to increase at an alarming rate, and, along with this increase, the shortages of food are becoming much more critical. The food famine is apparent in many parts of the globe. The mounting demand for food and the specter of starvation have intensified the need to reduce the destruction of food and fiber by crop pests. The augmented effort to increase food production has made promising strides but mostly in the more developed countries. With the increased pressure to produce more food and fiber with the high quality and low price to which we have been accustomed, we have ignored many of nature's forces. We have greatly increased food and fiber production but with certain costs. The increased demand for a low cost, high quality food has resulted in drastic changes in our agricultural practices, such as monoculture, intensified agriculture, high fertility levels, increased use of pesticides, and increased irrigation.

The benefits have been very impressive and have far outweighed the costs. However, some of the costs of these practices are chemical resistance in pests, possible threats to selected wildlife, possible human hazards and possible contamination of our environment. The public is becoming increasingly aware of the insults which we have placed upon our environment such as strip mining, pollution from sewage, manufacture waste, emission from cars and other vehicles, solid waste, pesticides, fertilizers, and so on down the line. With the growing awareness of the importance of high quality environment and even the remotest possibility of

human hazard, there has been a renewed trend to use all the means available to us for combatting plant pests. This practice is called integrated pest management (IPM). IPM is not really a new concept; rather, it has been practiced for centuries. However, during the past 15 years, increased attention has focused upon the development of integrated pest management in which the conventional pesticides are augmented by one or more nonchemical control practices. Many people think of IPM as relating only to biological control measures. I, personally, think of IPM as the use or integration of all control measures which are compatible and economically feasible for managing pest populations to an acceptable level. The various hierarchies of IPM systems are (1) integration of measures for controlling one pest on one crop, (2) integration of measures for controlling one group of pests such as insects, on one crop, and (3) integration of all practices for controlling all pests on a single crop system.

If integrated pest management is an old system, why the renewed interest and what is new? What is relatively new is the exacting scientific study and the careful and more knowledgeable application of a variety of control techniques. IPM is more of a science now than it was 20 to 30 years ago. For example, years ago we only knew that crop rotation was important; we now know why and when to rotate. We know now the number of sclerotia (reproductive bodies) of *Verticillium albo atrum* required to cause a severe crop loss to cotton and when crop rotation measures should be initiated in order to avoid severe losses. We now know more about the reproductive habits of codling moth on apples, how many broods a year there are and when

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applications of pesticides should be made. For many crops, IPM practices have been highly successful. One of the best examples is here in North Carolina and that is the program defined for control of pests on tobacco by Dr. Furney Todd and colleagues. For many crops, the basic knowledge

for designing successful programs is not available or the environment is not conducive. IPM in some cases has resulted in the reduced use of pesticides while in other instances it has not reduced the total amount of pesticides used but has changed the usage pattern.